Meteorology (BS)

To see more about what you will learn in this program, visit the Learning Outcomes website ([https://apps.orirp.ncsu.edu/pgas/](https://apps.orirp.ncsu.edu/pgas/))!

The degree of Bachelor of Science in Meteorology is offered in the Department of Marine, Earth and Atmospheric Sciences. A concentration in Marine Science may also be chosen.

Meteorologists study a diverse array of topics, including climate, air pollution, environmental impacts, weather analysis and forecasting, remote sensing, atmospheric physics and interactions between the atmosphere and other components of the earth system. Our undergraduate students pursue careers in air quality, weather forecasting, meteorological research, broadcast meteorology and positions with the armed forces. The proximity of the Environmental Protection Agency center in nearby Research Triangle Park, the NC Department of Air Quality, a strong working relation with the local media, and the presence of the State Climate Office and a NWS forecast office on the NC State campus all provide our students with a broad range of internship and employment possibilities.

For more information about our meteorology programs, visit our website ([https://meas.sciences.ncsu.edu/undergraduate/programs/atmospheric-science/](https://meas.sciences.ncsu.edu/undergraduate/programs/atmospheric-science/)) or contact:

Maggie Puyear, Associate Director of Undergraduate Programs
Email: mwpollar@ncsu.edu
Phone: 919.513.1093

Plan Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
<th>Counts towards</th>
</tr>
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<tbody>
<tr>
<td>COS 100</td>
<td>Science of Change</td>
<td>2</td>
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English / Communication

| ENG 101 | Academic Writing and Research ²            | 4     |

Select one of the following Advanced Writing courses:

| ENG 331 | Communication for Engineering and Technology |
| ENG 332 | Communication for Business and Management   |
| ENG 333 | Communication for Science and Research      |

Math / Statistics

| MEA 217 | Introduction to Computing in the Geosciences ² | 3     |
| MEA 315 | Mathematics Methods in Atmospheric Sciences ² | 4     |
| MEA 317 | Introduction to Atmospheric Thermodynamics    | 4     |
| MEA 412 | Atmospheric Physics ²                         | 3     |
| MEA 421 | Atmospheric Dynamics I ²                      | 3     |
| MEA 422 | Atmospheric Dynamics II ²                     | 3     |
| MEA 443 | Synoptic Weather Analysis and Forecasting     | 4     |

| MA 141 | Calculus I ²                                 | 4     |
| MA 241 | Calculus II ²                                | 4     |
| MA 242 | Calculus III                                 | 4     |
| MA 341 | Applied Differential Equations I             | 3     |
| ST 311 | Introduction to Statistics                   | 3     |
| ST 370 | Probability and Statistics for Engineers     |       |
| ST 371 | Introduction to Probability and Distribution Theory | |

Chemistry / Physics

| CH 101 | Chemistry - A Molecular Science ²           | 3     |
| CH 102 | General Chemistry Laboratory                 | 1     |
| CH 105 & CH 206 | Physics for Engineers and Scientists I and Physics for Engineers and Scientists I Laboratory ² | 4     |

Chemistry Option (p. 3) ²
ME 495 Junior Seminar in the Marine, Earth, and Atmospheric Sciences 1

Major Electives

Geophysical Science Option (p. 3) 3

MEA Restricted Electives (p. 2) 9

Approved Electives 16

Approved Electives constitute a minor field of emphasis consisting of at least 12 credit hours in a single discipline or related disciplines. These include, but are not limited to: biometeorology, chemistry, computer science, environmental quality, geology-geophysics, hydrology, mathematics, physics, physical oceanography, statistics, several areas of engineering, agriculture, forestry, science education, weather communication.

GEP Courses

GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/) 6

GEP Social Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/) 6

GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/) 2

GEP Additional Breadth (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-visual-and-performing-arts) 3

GEP U.S. Diversity (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-us-diversity/) (verify requirement)

GEP Global Knowledge (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/) (verify requirement)

Total Hours 120

1 COS 100 is for new freshmen only. Transfer students will need to select a course from the GEP Interdisciplinary Perspectives course list

2 A grade of C- or higher is required.

3 Approved Electives should be selected in consultation with advisor.

In order to qualify for federal civil servant meteorologist positions (i.e. National Weather Service), you must satisfy the GS 1340 requirements. As a result the following courses are strongly recommended: PY208/209, MEA 443, MEA 444, and MEA 511.

4 Advanced transfer students are permitted to substitute mathematics, science, or engineering credits for CH 201/202.

MEA Restricted Electives

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tr>
<td>MEA 415</td>
<td>Climate Dynamics</td>
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<td>MEA 425</td>
<td>Introduction to Atmospheric Chemistry</td>
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<tr>
<td>MEA 444</td>
<td>Mesoscale Analysis and Forecasting</td>
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<td>MEA 455</td>
<td>Micrometeorology</td>
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<tr>
<td>MEA 458</td>
<td>Introduction to Tropical Meteorology</td>
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<td>MEA 463</td>
<td>Fluid Physics</td>
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<td>MEA 467</td>
<td>Marine Meteorology</td>
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<td>MEA/CE 479</td>
<td>Air Quality</td>
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<td>MEA 488</td>
<td>Meteorology for Media</td>
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<td>MEA 493</td>
<td>Special Topics in MEAS</td>
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<td>MEA 498</td>
<td>Internship in MEAS</td>
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<td>MEA 510</td>
<td>Air Pollution Meteorology</td>
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<td>Introduction to Meteorological Remote Sensing</td>
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<td>MEA 514</td>
<td>Advanced Physical Meteorology</td>
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<td>MEA 515</td>
<td>Climate Dynamics</td>
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<td>MEA 517</td>
<td>Fundamentals of Climate Change Science</td>
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<tr>
<td>MEA 518</td>
<td>Adaptation to Climate Change</td>
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<td>MEA 519</td>
<td>Barriers to Climate Change Literacy</td>
<td>3</td>
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<td>MEA 525</td>
<td>Introduction to Atmospheric Chemistry</td>
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<tr>
<td>MEA/CE 579</td>
<td>Principles of Air Quality Engineering</td>
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<td>MEA 580</td>
<td>Air Quality Modeling and Forecasting</td>
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<td>MEA 581</td>
<td>Fluid Mechanics in Natural Environments</td>
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<td>MEA/GIS 582</td>
<td>Geospatial Modeling</td>
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<td>MEA 593</td>
<td>Special Topics in Atmospheric Science</td>
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### Chemistry Option

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<tr>
<td>CH 201 &amp; CH 202</td>
<td>Chemistry - A Quantitative Science and Quantitative Chemistry Laboratory</td>
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<td>CH 220 &amp; CH 222</td>
<td>Introductory Organic Chemistry and Organic Chemistry I Lab</td>
<td>4</td>
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<tr>
<td>CH 221 &amp; CH 222</td>
<td>Organic Chemistry I and Organic Chemistry I Lab</td>
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### Geophysical Science Elective

<table>
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<tr>
<td>MEA 101</td>
<td>Geology I: Physical</td>
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<td>MEA 200</td>
<td>Introduction to Oceanography</td>
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<td>PY 123</td>
<td>Stellar and Galactic Astronomy</td>
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<td>PY 124</td>
<td>Solar System Astronomy</td>
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<td>SSC 200</td>
<td>Soil Science</td>
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### Semester Sequence

This is a sample.
### GEP Additional Breadth

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#### Fourth Year

<table>
<thead>
<tr>
<th>Semester</th>
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<td><strong>Fall Semester</strong></td>
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<tr>
<td>MEA Restricted Electives (p. 2)</td>
<td>3</td>
</tr>
<tr>
<td>GEP Humanities</td>
<td>3</td>
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<tr>
<td>GEP Health and Exercise Studies</td>
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<td>MEA 443 Synoptic Weather Analysis and Forecasting</td>
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<td><strong>Total Hours</strong></td>
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<table>
<thead>
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<th>Semester</th>
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<td><strong>Spring Semester</strong></td>
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<td>Approved Elective</td>
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<tr>
<td>MEA Restricted Electives (p. 2)</td>
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<tr>
<td>MEA Restricted Electives (p. 2)</td>
<td>3</td>
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<tr>
<td>GEP Social Sciences</td>
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<td><strong>Total Hours</strong></td>
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Total Hours: 120

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1. COS 100 is for new freshmen only. Transfer students will need to select a course from the GEP Interdisciplinary Perspectives course list.
2. A grade of C- or higher is required.
3. Approved Electives should be selected in consultation with advisor. In order to qualify for federal civil servant meteorologist positions (i.e. National Weather Service), you must satisfy the GS 1340 requirements. As a result the following courses are strongly recommended: PY208/209, MEA 443, MEA 444, and MEA 511.

### Career Opportunities

MEAS undergraduate degree programs provide talented students with the foundation of scientific knowledge required for careers in government, industry, or academia. Many students pursue graduate degrees and pursue careers in industry, at government agencies and in academia.

Marine Sciences graduates go on to become oceanographers, to manage our coastal resources, model air-sea interaction, and explore global climate change. They conduct basic and applied research, serving as environmental consultants for industry and governmental agencies, policy and management experts for governmental agencies, and environmental science educators. Graduates with a Natural Resources degree are versed in the fundamental processes and interdisciplinary nature of the coastal zone. As scientists, managers, administrators, and regulators, they make decisions regarding use and conservation of coastal and marine resources.

Geology graduates address society’s needs for dealing effectively with earth processes, such as water resources and the stability of land forms. They work for engineering firms, permit-issuing agencies, and industries that rely on geological resources. Historical geologists are familiar with the evolution of earth through time and provide a perspective on potential long-term reactions of the earth systems to change. Those who concentrate in Environmental Geology are trained to assess and monitor geological resources such as ground water. Marine geologists are experts in the complex issues facing industry, municipalities, and residents in the dynamic and ecologically vulnerable coastal zone.

Meteorology graduates enjoy careers in weather forecasting, air quality assessment, development of weather products and services, broadcast communications, and advanced research. Marine meteorologists study ocean-generated weather systems. Their research is yielding practical benefits such as refined prediction of storm surge, which has streamlined evacuation efforts during severe storms along the Carolina coast. Meteorology graduates with an air quality emphasis work for environmental firms, regulatory agencies, and in applied research. Study of air quality and how air pollution is transported and dispersed is a rapidly expanding field in the atmospheric sciences.

MEAS graduates play a key service role for the State of North Carolina, assisting in everything from forecasting severe storms and analyzing the impact of atmospheric pollutants on agriculture and our estuaries, to determining the effects of toxic waste disposal on quality of surface and ground water.